Illinois Department of Transportation
2300 South Dirksen Parkway / Springfield, Illinois / 62764

BDE PROCEDURE MEMORANDUM

NUMBER: 16-00

SUBJECT: Quality Assurance/Quality Control Guidelines for Work By Consulting Engineers

DATE: April 3, 2000

This memorandum supersedes and replaces BDE Procedure Memorandum 95-17, dated February 1, 1995.

Background

The purpose of this memorandum is to establish guidelines to assist consulting engineering firms in preparing Quality Assurance/Quality Control (QA/QC) plans.

Applicability

The procedures in this memorandum are applicable to all engineering/architectural contracts with the department.

Procedures

An acceptable QA/QC plan is required for all engineering/architectural contracts. This includes district-wide, statewide and construction engineering projects.

QA/QC will be part of the negotiation process for each project. Discussions of the QA/QC procedures should begin at the scope of services meeting and the discussions could continue through the negotiating sessions. If an acceptable QA/QC plan cannot be developed by the selected consultant, steps will be taken to begin negotiations with the firm that was ranked second at the selection meeting.

Attached to this memorandum are the "Quality Assurance /Quality Control Guidelines for Work by Consulting Engineers", effective November 1, 1994.

Contact the Agreements Unit (BDE) at 217/782-3408 if there are questions concerning the guidelines.

Engineer of Design and Environment Michael L. Hine

Attachment

INTRODUCTION

The department for several years has been striving to improve the quality of the product delivered by the consultant industry. In general, firms used on IDOT work deliver a good product or service. There are instances where less than adequate performance has resulted in errors and/or delays. This has resulted in costs not only to the citizens of the state but to the firms involved in the project.

Many of the firms that demonstrate best performance for the department were using some form of quality assurance/quality control (QA/QC); therefore, in January 1992, the department instituted QA/QC for all IDOT work performed by consultants.

QA/QC will be part of the negotiation process for each project. Discussions of the QA/QC procedures should begin at the scope of services meeting and continue through the negotiation sessions. If an acceptable QA/QC plan cannot be developed by the selected consultant, the department will initiate negotiations with the firm that was ranked second at the selection meeting.

These guidelines have been developed to assist firms in preparing a QA/QC plan and to set forth concepts that may improve existing QA/QC plans.

DEFINITIONS

Calculations:

Written documentation of assumptions, analysis, and conclusions for design of an element of a project.

Checklist:

A list of things, names, etc., to be checked off or referred to for verifying, comparing, ordering, etc.

Communication:

Giving or exchanging of information, signals, or message as by talk, gestures, or writing. Communication is required throughout the process, is the responsibility of everyone, and must be open.

Compliance:

The act of following the stated quality assurance plan. An act of complying with a requirement, directive, etc.

Computations:

Written documentation of the figuring of quantities for a project.

Computer Program Verification:

Assurance that a computer program correctly performs the operations specified in a numerical model. Usually accomplished by comparing program results to (1) a hand calculation, (2) an analytical solution or approximation, (3) a verified program designed to perform the same type of analysis, or (4) a comparison with a test case provided by the vendor of the program.

Consultant:

The firm providing professional services as a party to a Standard Agreement (IDOT Standard Agreement Provisions for Consultant Services, 2000). An expert who is called on for professional or technical advice or opinions.

Corrective Action:

Measures taken to rectify conditions adverse to quality and, where necessary, to preclude repetition.

Department:

The Department of Transportation of the State of Illinois.

Design Control:

Requirement providing assurance that a design is defined, controlled, and verified.

Documentation:

Any written or pictorial information describing, defining, specifying, reporting, or certifying activities, requirements, procedures, or results.

Final Documents:

Approved document and approved changes thereto.

Performance:

The act of carrying out the stated objectives on a project.

Planning:

Those activities needed to assure that the correct people are performing the correct tasks using the correct tools in the correct sequence. The end product should be identified and kept in mind when performing planning activities to ensure that the end product contains the required quality.

Project Budget:

A comprehensive description of the costs associated with all the services required of the consultant, including labor costs, direct expenses, overhead costs, and profit.

Project Team:

The Department's and the Consultant's staff assigned to the project with specified duties and responsibilities, participating together in a cooperative manner.

Project Resources:

All things available to the project team to complete the project, including people, tools, information, equipment, etc.

Project Manager:

The individual assigned by the Consultant to act as the liaison between the consultant and the Department in matters relating to the achievement of project requirements, including budget control, schedules, milestones, and quality objectives.

Project Schedule:

A comprehensive description of all significant services required of the CONSULTANT and of all actions required of the DEPARTMENT and Approving Parties by the obligations of the AGREEMENT, together with the durations and/or dates for performing these services and actions.

Quality:

Meeting valid requirements so that the product produced is suitable for its intended use (quality in fact). Providing what is expected (quality in perception).

Quality Assurance:

All those planned and systematic actions necessary to provide adequate confidence that a structure, system, or component will perform satisfactorily in service. Also see attached.

Quality Assurance Manager:

The individual assigned by the Consultant to have full authority and responsibility for generating, updating, monitoring, and maintaining the quality assurance program, and responsibility for verifying conformance to the QA requirements as set forth by the Department and applicable codes and standards.

Quality Assurance Plan:

A document describing the implementation of the Quality Assurance Program on a specific project, including organizational responsibilities, applicable procedures, and other information required to address client (contractual) quality requirements. The plan may also address any unique contractual requirements or modifications.

Quality Assurance Procedures:

A quality assurance document that outlines a planned and systematic action for various quality affecting activities requiring quality control.

Quality Control: (See attached)

A system for maintaining desired standards in a product or process, especially by inspecting samples of the product.

QA Records:

A completed document that furnishes evidence of the quality of items or activities affecting quality. A record is an authentic, official copy (or original) of a document retained to attest to past decisions, actions, or events.

Scope of Services:

All the actions required of the consultant to complete the obligations for the project.

Training:

In-depth instruction provided to personnel to develop and demonstrate initial proficiency in the application of selected requirements, methods, and procedures, and to adapt to changes in technology, methods, or job responsibilities.

Valid Requirements:

Those requirements established so that the resulting product will satisfy the customer's expectations on schedule and within planned resources.

Verification:

The act of reviewing, inspecting, testing, checking, auditing, or otherwise determining (and documenting) whether items, processes, services, or documents conform to specified requirements. Assuring that the project team is doing the right thing and that the work being performed (or that has been performed) is performed correctly.

ELEMENTS OF A QA/QC PLAN

I. PROJECT TEAM

This section should include a list of key personnel from in-house staff, outside consultants and client liaison. A typical project team should include:

- Project Manager
- Client Liaison
- Technical Support Staff
- Outside Consultants
- QA/QC Reviewer

This section should also include a brief description of the key members' responsibilities.

II. WRITTEN PROJECT PLAN

A. PROJECT SCOPE

This section should include a brief description of the project and the purpose and need for the project. The matter of possible future expansion of the facilities should be considered and addressed. Will the project be done in English or metric units? Will the project include more than one contract (i.e. two or more sections)? For the majority of projects there will be a single contract. Anything significantly different for this project should be noted in this section.

B. SUBCONSULTANT'S ROLE

All subconsultants should be listed and identified. The scope of work each is responsible for should be clearly delineated. The subconsultants' key project personnel and telephone numbers should be listed. All deliverables with time frames need to be identified. These deliverables can be from the subconsultant to the consultant and in certain instances vice versa.

C. STANDARDS AND GUIDELINES

All appropriate manuals and memorandums applicable to the project should be listed.

D. TIME SCHEDULE

This section should be developed with a considerable amount of thought. The success of the project can often hinge on the time schedule.

The schedule should include the estimated agreement date, start-up meeting date and periodic milestones. The number of milestones will likely vary considerably depending on the size and type of project. It is important that these not be minimized.

Deliverables with dates for submittals to various parties to the agreement should be established. Reasonable float time and review time should be incorporated in the overall schedule.

In-house quality assurance reviews should be scheduled in accordance with the various milestones and deliverables. These should be scheduled several times during the project rather than as a final, comprehensive check.

Report phase milestones and preliminary submittal date needs to be scheduled. Startup date for preliminary design along with milestones and submittal date to IDOT should be listed.

Periodic meetings with IDOT will be required. These should be identified up-front and be coordinated with the various deliverables and the review thereof. It is recognized that these may change at various times due to circumstances. The entire Time Schedule is a dynamic schedule and may be reviewed and adjusted periodically.

Starting date for final design along with any overlap with the preliminary design needs to be identified. Periodic milestones during this stage should be listed.

E. MANHOUR BUDGET

A manhour budget should be prepared by classification and broken down by work tasks. It is advisable that percent of total budget expected to be expended at various milestones be determined. This should assist the consultant in monitoring progress and assist in providing early alerts if there is a problem with the budget.

F. RESOURCE MATERIAL

This section should consist of a listing of pertinent information available for the project including items such as:

- Existing drawings
- Previous reports
- Soil borings
- TS&L
- Boundary surveys
- Easements

G. ESTIMATED CONSTRUCTION BUDGET

This section should note the anticipated total construction cost. It is important this cost be kept in mind because if during the course of design the consultant has reason to believe the cost will be greater he should so advise IDOT. The goal is to avoid unpleasant surprises further down the road.

Cost limitations by segment, where applicable, need to be identified and listed.

H. SPECIAL CONDITIONS

If the project has any special requirements, they should be set forth in this section. Special construction materials are sometimes required for a project and if so should be noted.

III. PROJECT CONTROL

A. PROCEDURES

Procedures for quality control are often in the form of check lists. The procedures are intended to assure completeness of the function and conformance of the project.

1. Engineering and Environmental Studies/Plan Preparation

a. Scoping/Field Checks

This procedure should itemize basic elements to be reviewed and evaluated during the initial field inspection of a project. The basic elements should include, but are not limited to, inspection of pavement condition, logical termini, drainage problems, hazards, existing guardrail condition, handicap accessibility, evidence of wells, gas pumps or storage tanks, and other environmental considerations.

b. Contents of Submittals

This procedure should provide a consistent definition of the content of the various key submittals.

1. Preliminary Reports
2. Prefinal Reports
3. Final Reports
4. Preliminary Plans
5. Prefinal Plans
6. Final Plans

c. Special Provision Preparation

This procedure should define the proper preparation of a contract special provision and provide a procedural method to assure a clearinghouse for unnecessary special provisions.

2. Design Calculations

a. Quantity Calculations

b. Checking Calculations

3. Computer Inputs/Outputs

This procedure should define the software applications and the process for verifying results.

4. Documentation of directives. Meeting minutes and telephone communications

This procedure should provide guidelines for consistent documentation of project decisions and directives.

5. Dissemination of correspondence and documents

This procedure should provide guidelines for consistent dissemination of project decisions and directives.

B. PROJECT RECORDS

The intent of this section is to specify the requirements for the preparation and maintenance of project records generated by the Project Team. The key features of these requirements are summarized as follows:

- Records are legible, identifiable and retrievable,
- Records are protected from damage or loss, and
- Responsibilities for routing, maintaining, accessing, transferring, and long-term storage are specified.

Project records generated during project work activities may include, but are not limited to: informational records, field records, data compilation and testing records, data interpretation records, calculation and computer records, telephone messages, and draft and final reports.

The Department expects that quality records will be maintained to demonstrate achievement of the required quality and that the QA/QC plan is being followed. Pertinent subconsultant quality records should be an element of these records.

Where agreed contractually, quality records shall be made available for review by the Department for an agreed period.

COMPLIANCE STATEMENTS

All agreements will contain language that requires "statements of compliance" with the QA/QC plan that was prepared by the consultant and approved by the department.

Statements of compliance are required on an interim basis and at the conclusion of the work.

The interim statements of compliance would be required throughout the project at each major milestone. For example, a statement of compliance would be made for a typical contract plans project at the preliminary plans, pre-final plans and tracings/final documents stages. The interim statements of compliance would be satisfied with a sentence added to the consultant's letter of transmittal which states that the plans were prepared in compliance with the approved QA/QC plan.

The final statement of compliance will be on the department's form (see Attachment A).

VERIFICATION PROCESS

The department will review selected projects to verify that the consultant's plan as approved by the department has been followed.

Selection of jobs to be reviewed will consider type of work, size of project, district or central bureau, and level of performance so that the results of the review will be meaningful.

The review will be conducted at the consultant's office. Participants would include, but not be limited to, the consultant's project manager, consultant's QA/QC manager, district/central office project manager and representatives from the department's central bureaus.

Generally, the review would be one-half day and would occur prior to completing the work. The firm being reviewed would be furnished questions and/or statements to assist in preparation for the review meeting. The review meeting would begin with a brief overview of the QA/QC plan by the consultant. The department's review team would then proceed through the questions/statements previously furnished to the consultant.

A report will be prepared by the review team and a copy will be furnished to the consultant.

The purpose of the verification process is not limited to determining if the QA/QC plan is being followed. An important outcome of the process will be to find innovative ideas that can be shared with others and to identify areas that could be modified to improve quality.

The districts or central bureaus may conduct their own verifications in addition to the formalized process described above.

In the event of non-compliance with the QA/QC plan, certain actions by the department may occur but it is essential that the consultant demonstrate to the department that corrective action has been taken to assure future compliance. The agreements will state that non-compliance could result in termination of the contract and/or have an affect on the firm's prequalification status. Non-compliance that leads to less than satisfactory performance would be a consideration in the selection of firms for work in the future.

Illinois Department of Transportation

Affidavit of Completion

Route _____

Section _____

State of _____ County _____

County of _____ Job No. _____

Firm Name _____

PSB No. _____

Affidavit

The undersigned, having completed the professional services required by its Agreement, dated _____ , with the State of Illinois and any subsequent agreed modifications thereto, on the above Route(s) and Section(s), being duly sworn on oath, says that all sums of money due to its employees, subcontractors or suppliers for any labor, material (including freight and demurrage charges), apparatus, fixtures, or equipment used in performing such services and all damages, direct or indirect, suffered or claimed on account of such services, have been paid except for the _____ from whom the attached consents(s) to such final payment have been obtained.

To the best of my / our knowledge, information and belief, the professional services were performed in compliance with the Quality Control / Quality Assurance Plan approved by the Department.

_____

By _____

Subscribed and sworn to before me this _____ day of _____ .

(SEAL)

_____

My commission expires _____